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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of : Confirmation No. 2531  
Hideo MIZUTA : Docket No. 2003\_0974A  
Serial No. 10/621,310 : Group Art Unit 2819  
Filed July 18, 2003 : Examiner Jean B. Jeanglaude

MAGNETIC ENCODER

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**PETITION TO WITHDRAW THE HOLDING OF ABANDONMENT**

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

It hereby is petitioned that the holding of abandonment in the above-identified application be withdrawn.

The facts necessitating this petition are as follows:

1. On March 23, 2004 Group Art Unit 2819 issued an Office Action under *Ex Parte Quayle* in the above-identified application, setting a two month shortened statutory period for response, and a six month extended statutory period for response.

2. On September 23, 2004, i.e., within the six month extended statutory period for response, Applicants filed a response to the Office Action of March 23, 2004, along with a fee for a four month extension of time.

3. In support of the fact of filing a response on September 23, 2004, enclosed herewith is a copy of the date-stamped postcard receipt received from the Patent and Trademark Office indicating that the response to the *Ex Parte Quayle* Office Action was received by the PTO on September 23, 2004. Applicants are also enclosing herewith a copy of the response filed on September 23, 2004.

4. On September 28, 2004 Group Art Unit 2819 issued a Form PTO-1432 "Notice of Abandonment" alleging that the above-identified application is abandoned since "no response has been received" to the Office Action of March 23, 2004.

As is apparent from the above, the holding of abandonment of this application is incorrect. Thus, there is no abandonment in fact in this application, since the response to the March 23, 2004 Office Action was timely filed.

In view of the above, it is requested that the holding of abandonment be withdrawn.

Respectfully submitted,

THE COMMISSIONER IS AUTHORIZED  
TO CHARGE ANY DEFICIENCY IN THE  
FEE FOR THIS PAPER TO DEPOSIT  
ACCOUNT NO. 23-0975.

Hideo MIZUTA

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October 6, 2004

Due Date: September

ATTY DOCKET #: 2003\_0974A

Confirmation No. 2531

OUR REF: 2003\_0974A/KWF/00274

Applicant: Hideo MITZUTA

Serial No.: 10/621,310

Title: MAGNETIC ENCODER

Filing Date: July 18, 2003



Receipt of the following papers is acknowledged:

1. Fee Transmittal Form (in duplicate)
2. Petition for Extension of Time
3. Response to ex Parte Quayle Action
4. Check in the amount of \$1,480.00

Date: September 23, 2004

[Check No.]

Attorney: KWF/kes





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In re application of : **Confirmation No. 2531**  
Hideo MIZUTA : Docket No. 2003\_0974A  
Serial No. 10/621,310 : Group Art Unit 2819  
Filed July 18, 2003 : Examiner Jean B. Jeanglaude  
MAGNETIC ENCODER

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**RESPONSE TO EX PARTE QUAYLE ACTION**

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

In response to the Office Action of March 23, 2004, the period for response having been extended for four months by the attached petition, please amend the above-identified application as follows:

## **AMENDMENTS TO THE SPECIFICATION**

**Please amend the specification as follows:**

**Please replace the paragraph beginning page 1, line 23, with the following rewritten paragraph:**

As the magnetic powder used here, in general, ferrite powder is adopted. Rare earth magnetic materials, being poor in the kneading workability and the formability and high in the cost, have been considered unsuitable to mix with the rubber material and have not been adopted in forming the magnetic encoder.

**Please replace the paragraph beginning page 2, line 12, with the following rewritten paragraph:**

In a magnetic encoder that uses ferrite powder as the magnetic powder, as mentioned above, the magnetic force is small; accordingly, in order to endow with practical magnetic characteristics, the ferrite has to be packed in with high density. However, when the ferrite is densely packed, physical properties of the rubber deteriorate largely.

**Please replace the paragraph beginning page 2, line 25, with the following rewritten paragraph:**

An object of the present invention is to overcome problems present in the existing magnetic encoders that use the ferrite powder as the magnetic powder and to provide a magnetic encoder

having strong magnetic characteristics, and is excellent in the formability, and realizable even in view of price.

**Please replace the paragraph beginning page 3, line 4, with the following rewritten paragraph:**

The present Present inventors, after studying variously of various magnetic encoders that use rare earth magnetic material and conducting tests of the magnetic characteristics, found a magnetic encoder that has strong magnetic characteristics, is excellent in the formability and is realizable also from a viewpoint of price.

**Please replace the paragraph beginning page 3, line 9, with the following rewritten paragraph:**

The present invention will be explained with reference to the attached drawings. The magnetic encoder according to the invention, as shown in Figs. 1, 2 and 3, can be used in a wheel bearing (not shown in the drawing), forms a pulse train by means of a magnetic force and generates codes.

**Please replace the paragraph beginning page 3, line 14, with the following rewritten paragraph:**

The magnetic encoder according to the invention is formed by radially magnetizing a magnetic rubber ring 2 with alternate S poles and N poles, said magnetic rubber ring 2 is being

formed by mixing a rubber material and a magnetic powder, wherein rare earth magnetic powder is used as the said magnetic powder.

**Please replace the paragraph beginning page 3, line 19, with the following rewritten paragraph:**

Another magnetic encoder according to the invention is obtained by radially magnetizing a magnetic rubber ring 2 with alternate S poles and N poles, said magnetic rubber ring 2 is being formed by vulcanizing and adhering a magnetic rubber base (not shown in the drawing) to a reinforcement ring 1, wherein the magnetic rubber base is formed by mixing unvulcanized rubber and rare earth magnetic powder.

**Please replace the paragraph beginning page 4, line 12, with the following rewritten paragraph:**

In the magnetic encoder according to the invention, rare earth magnetic powder is used; accordingly, with such a small size, a magnetic force necessary for the magnetic encoder that can be used in a wheel bearing[[.]] forms a pulse train by means of the magnetic force and generates codes that can be obtained. Thereby, a magnetic encoder can be made smaller in size and lighter in weight.

**Please replace the paragraph beginning page 4, line 24, with the following rewritten paragraph:**

As the rubber material, similarly similar to the case of the existing magnetic encoder where the ferrite powder is used as the magnetic powder, any one of nitrile rubber, hydrogenated nitrile rubber, acrylic rubber, butyl rubber and fluororubber can be used.

**Please replace the paragraph beginning page 7, line 21, with the following rewritten paragraph:**

According to the invention, in order to form a magnetic rubber ring 2 that constitutes a magnetic encoder, rare earth magnetic powder comprising neodymium (Nd), iron (Fe) and boron (B) are combined, or rare earth magnetic powder comprising samarium (Sm), iron (Fe) and nitrogen (N) are combined and is mixed with the rubber material. Thereby, since a high magnetic force can be exhibited, a magnetic encoder can be made smaller in size and lighter in weight, and measurement accuracy thereof can be drastically improved.

**Please replace the paragraph beginning page 10, line 18, with the following rewritten paragraph:**

Except that a combination of samarium (Sm), iron (Fe) and nitrogen (N) is used as a rare earth magnetic powder, similarly similar to Example 1, a magnetic encoder according to the invention (effected product 2) was obtained. As the rare earth magnetic powder, one that has a composition,  $\text{Sm}_2\text{Fe}_{17}\text{N}_{2.7}$ , was used.

**Please replace the paragraph beginning page 10, line 24, with the following rewritten paragraph:**

Except that in Example 1, in place of the rare earth magnetic powder, ferrite powder was used, similarly similar to Example 1, an existing magnetic encoder (comparative product 1) was formed.

**Please replace the paragraph beginning page 11, line 24, with the following rewritten paragraph:**

In Examples 1 and 2, a method in which the magnetic rubber base in which unvulcanized rubber and rare earth magnetic powder are mixed was vulcanized, molded and adhered to the reinforcement ring 1, and thereby the magnetic rubber ring 2 was molded ~~was shown~~; however, other forming method methods can be adopted.

**Please replace the paragraph beginning page 12, line 4, with the following rewritten paragraph:**

For instance, after a sheet of a magnetic rubber base in which rare earth magnetic powder is mixed is cut out in a ring shape, this is vulcanized and adhered to a reinforcement ring 1, and thereby forming formed in one body. In this case, it is advantageous in that the workability is excellent in the magnetizing step.

## AMENDMENTS TO THE ABSTRACT

**Please amend the abstract as follows:**

A magnetic encoder is provided for use in a wheel bearing that forms a pulse train by means of a magnetic force and generates a code. The magnetic encoder is obtained by radially magnetizing a magnetic rubber ring with alternate S poles and N poles, said wherein the magnetic rubber ring is formed by vulcanizing and adhering a magnetic rubber base, in which unvulcanized rubber and rare earth magnetic powder are mixed, to a reinforcement ring.

## AMENDMENTS TO THE CLAIMS

1. (Currently Amended) A magnetic encoder for use in a wheel bearing that forms a pulse train by means of a magnetic force and generates a code, wherein the magnetic encoder is formed by radially magnetizing a magnetic rubber ring with alternate S poles and N poles,

wherein said magnetic rubber ring is formed by mixing a rubber material and a magnetic powder, characterized by the and wherein said magnetic powder being is a rare earth magnetic powder.

2. (Original) The magnetic encoder as set forth in claim 1, wherein the rare earth magnetic powder comprises neodymium (Nd), iron (Fe) and boron (B).

3. (Original) The magnetic encoder as set forth in claim 1, wherein the rare earth magnetic powder comprises samarium (Sm), iron (Fe) and nitrogen (N).

4. (Currently Amended) The magnetic encoder as set forth in claim 1, wherein [[a]] said magnetic rubber ring has a thickness in the a range of from 0.2 to 2.0 mm.

5. (Currently Amended) A magnetic encoder for use in a wheel bearing that forms a pulse train by means of a magnetic force and generates a code, wherein the magnetic encoder is formed by radially magnetizing a magnetic rubber ring with alternate S poles and N poles, and wherein said magnetic rubber ring is formed by vulcanizing and adhering a magnetic rubber

base, in which unvulcanized rubber and rare earth magnetic powder are mixed, to a reinforcement ring.

6. (Original) The magnetic encoder as set forth in claim 5, wherein the rare earth magnetic powder comprises neodymium (Nd), iron (Fe) and boron (B).

7. (Original) The magnetic encoder as set forth in claim 5, wherein the rare earth magnetic powder comprises samarium (Sm), iron (Fe) and nitrogen (N).

8. (Currently Amended) The magnetic encoder as set forth in claim 5, wherein [[a]] said magnetic rubber ring that is vulcanized, molded and adhered to [[a]] said reinforcement ring has a thickness in ~~the a~~ range of from 0.2 to 2.0 mm.

9. (Currently Amended) The magnetic encoder as set forth in claim 2, wherein [[a]] said magnetic rubber ring has a thickness in ~~the a~~ range of from 0.2 to 2.0 mm.

10. (Currently Amended) The magnetic encoder as set forth in claim 3, wherein [[a]] said magnetic rubber ring has a thickness in ~~the a~~ range of from 0.2 to 2.0 mm.

11. (Currently Amended) The magnetic encoder as set forth in claim 6, wherein [[a]] said magnetic rubber ring that is vulcanized, molded and adhered to [[a]] said reinforcement ring has a thickness in ~~the a~~ range of from 0.2 to 2.0 mm.

12. (Currently Amended) The magnetic encoder as set forth in claim 7, wherein [[a]]  
said magnetic rubber ring that is vulcanized, molded and adhered to [[a]] said reinforcement ring  
has a thickness in the a range of from 0.2 to 2.0 mm.

**REMARKS**

Claims 1-12 are all the claims pending in this application.

Applicants thank the Examiner for indicating that this application is in condition for allowance except for formal matters. It is respectfully submitted that this response addresses the formal matters identified by the Examiner, and therefore, that the application is in condition for allowance.

In particular, Applicants note that the abstract has been amended to remove all instances of "means" and "said", and that claim 1 has been amended to delete "the" before the phrase "said magnetic". In addition, Applicants note that the claims have been amended for improved clarity and general readability purposes, without narrowing the scope of the claims. Applicants also note that a number of editorial amendments have been made to the specification and abstract for grammatical and general readability purposes. No new matter has been added.

In view of the foregoing, it is respectfully submitted that this application is now in condition for allowance and should be passed to issue at the earliest possible time. If for any reason the Examiner finds the application other than in condition for allowance, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

Respectfully submitted,

Hideo MIZUTA

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